Wisconsin 21 Corridor Transportation Plan

TECHNICAL MEMORANDUM

Subject: Crash Analysis

Introduction

The Wisconsin Department of Transportation is performing a transportation study for the Wisconsin STH 21 corridor from Rivermoor Road to USH 41 in Oshkosh, WI. The objective of this transportation study is to identify and understand the traffic issues along STH 21 and to evaluate alternatives for alleviating future traffic congestion.

This technical memorandum summarizes the project's crash analysis. For this analysis, the corridor was extended slightly on both the west and east ends. On the west end, the portion of STH 21 to the west of Rivermoor Road up to the western end of the approach curves was included. On the east, the analysis area was extended to the intersection with Westfield Street. Figure 1, at the end of this report, shows these limits. The corridor was also divided into two segments; the two lane section in the west and the four-lane divided section in east. Figure 2 and Table 1 below show the limits and the length of the two segments.

Figure 2 Study Corridor and Analysis Segments

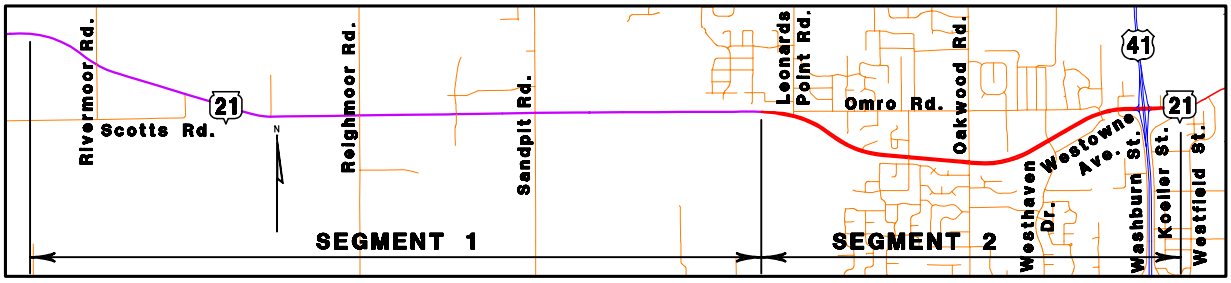

Table 1. STH 21 Study Corridor Segments

Segment	Length (Miles)	Beginning at	Ending At
1	4.50	Start of Curve West of Rivermoor Road	Just west of Leonard Point Road
2	2.40	Just west of Leonard Point Road	Oshkosh Ave.
TOTAL	**6.90**		

Segment 1 comprises the rural, two-lane section of the study area. This segment is characterized by high speeds (speed limits of 55 miles per hour) and rural abutting land uses that result in infrequent access points at a few driveways and local roads, which are controlled by stop signs. Segment 2 is the urban, four-lane portion of the study area. This section contains a median that is broken only at intersections. Access to the abutting land is provided from the intersecting roads and not directly from STH 21. Except for the three intersections at the western end of this segment (Leonard Point Road, Creekside Drive and Honey Creek Road) all of the intersections are controlled by traffic signals. The speed limit of this segment varies from 55 mph at the western end, changing to 45 mph about midway and finally to 35 mph and 30 mph at the eastern end.

Roadway Safety

WisDOT considers roadway safety a top priority and continually monitors safety characteristics on all of its transportation facilities. Crashes impose a cost to both the drivers involved and the public as a whole.

To monitor the performance and safety of Wisconsin's highways, WisDOT collects traffic volume and crash data from which crash rates are calculated. The time period reviewed for this analysis is the most recent five year period for which crash data is available, 2000 through 2004.

From the summary crash data that was used for this report, it is not possible to determine with certainty that all of the crashes that are listed are attributable to STH 21. Inconsistencies in reporting, coding and sorting locations all contribute to this uncertainty. At intersections, and particularly at the USH 41 ramp intersections, the summary data was reviewed and only those crashes that were directly related to the STH 21 intersections were included. Those that occurred on the USH 41 mainline or non-intersection type crashes on the ramps themselves were not included. Deer collisions were also omitted from the data.

Figure 1 shows the limits, the overall crash rates, the injury rates, and the fatality rates for each segment. Each intersection and the link between them is color coded to indicate the total number of crashes. The numbers of property damage only, injury and fatal crashes are also indicated. A tabulation of this data is included as Appendix A.

Methodology

This section explains the methodology behind the procedures and calculations performed as part of the STH 21 crash study.

AADT. The average annual daily traffic volumes for each link in the roadway network are published by WisDOT in the Wisconsin Highway Traffic Volume Data book. The average AADT value for each of the two segments in the study area was calculated similarly. The AADT for each link in the segment was

multiplied by its length and the sum of these values for all the links in the segment was divided by the total segment length. This process yielded a weighted average AADT for each segment. This process was performed on the published 2000 and 2004 traffic volume data and the results averaged. Table 2 summarizes these calculations.

Table 2. AADT by Links and Weighted Average AADT (2000-2004)

Segment	Segment Length (Miles)	Description Reference Point 1	Description Reference Point 2	Est. Link Distance	AADT 2000	Weighted Average Segment AADT 2000	AADT 2004	Weighted Average Segment AADT 2004	Study Period Average AADT
1 2-Lane Rural	4.50	West of Rivermoor	CTH FF	2.00	11,000	**11,833**	11,900	**11,789**	**11,811**
		CTH FF	Leonard Point Rd	2.50	12,500		11,700		
2 4-Lane urban	2.40	Leonard Point Rd	Oakwood Road	1.10	15,200	**17,983**	14,900	**18,650**	**18,317**
		Oakwood Road	Westhaven Drive	0.50	17,800		16,300		
		Westhaven Drive	Omro Road	0.30	17,800		18,700		
		Omro Road	NB 41 Ramp	0.30	27,200		34,300		
		NB 41 Ramp	Oshkosh Ave.	0.20	20,200		21,600		

Vehicle Miles Traveled (VMT). VMT is a measure of the number of vehicles and the distance that was traveled. The daily VMT is calculated by multiplying the roadway segment distance by the AADT. This value, multiplied by 365, is the number of vehicle miles traveled in a year.

Crash Rate. The average crash rate for each segment is the number of crashes over the five-year period that occurred in that segment divided by the five-year VMT for the segment.

Fatality and Injury Rates. Fatality and injury rates are calculated in the same way that overall crash rates are calculated, except only fatal crashes are included for the fatality rates and only injury crashes are used for the injury rates.

Vehicle Miles Traveled

Table 3 shows the approximate average VMT for each segment in the STH 21 study area for the years 2000 through 2004.

Table 3. Traffic Volumes and Vehicle Miles Traveled (VMT) on STH 21 (2000-2004)

Segment	Description	Length (Miles)	Avg AADT (2000 – 2004)	Annual Average VMT[1] (millions)	5- Year VMT (millions)
1	Two Lane (Rural)	4.5	11,811	19.400	96.998
2	Four-Lane (Urban)	2.4	18,317	16.046	80.229

[1] VMT = Vehicle Miles Traveled, which equals the Roadway length x AADT x number of days in time period.

Total Crashes & Crash Rates

The VMT and the number of crashes for a roadway segment are used to calculate the crash rate. The crash rate, expressed in total number of crashes per hundred-million vehicle miles traveled, allows comparisons to be made between roadway sections throughout the State of Wisconsin. The Department of Transportation calculates two statewide average crash rates: one for rural state highways and one for urban state highways. Based on abutting land use, the crash rates for Segment 1 are compared to the rural statewide crash rates and the rates for Segment 2 are compared to the urban statewide crash rates.

Table 4 shows the crash totals and crash rates for the two segments in the STH 21 study area, as well as the state average crash rates.

Table 4. Crash Totals and Rates on STH 21 (2000-2004)

Segment	Description	Crashes	2000-2004 Crash Rate[1]	State Average Crash Rate[1]
1	Two Lane (Rural)	73	75.26	112
2	Four-Lane (Urban)	499	**621.97**	283

[1] Crashes per 100 million vehicle miles traveled.

Fatality and Injury Rates

Table 5 compares the fatality and injury rates of the study area to the statewide average rates for the corresponding location of the roadway. As can be seen, the fatality rate for Segment 1 is almost double the statewide average and the Injury Rate for Segment 2 is over two and one-half times higher than the statewide average.

Table 5. Fatality and Injury Rates vs. State Average Rates (2000 – 2004)

Segment	Description	Injury Crashes	Injury Rate [1]	State Avg Injury Rate [1]	Fatal Crashes	Fatality Rate [2]	State Avg Fatality Rate [2]
1	Two Lane (Rural)	36	37.11	45.00	3	**3.09**	1.70
2	Four-Lane (Urban)	212	**264.25**	98.20	0	0.00	0.60

[1] Injury Rate = Number of crashes resulting in injuries per 100 million vehicle miles traveled
[2] Fatality Rate = Number of crashes resulting in fatalities per 100 million vehicle miles traveled

Non-Intersection and Intersection Crashes

The summary data that was used for this analysis identifies the crashes that are non-intersection related and those that are related to intersections. In Table 6, the number of non-intersection and intersection related crashes are summarized by segment. In Segment 1, where the intersections are less congested and less frequent, approximately 30% of the crashes occurred at intersections. In Segment 2, where the intersections are more frequent and traffic congestion is greater, over 75% of the crashes are intersection related.

Table 6. Crash Totals and Rates on STH 21 (2000-2004)

Segment	Description	Total Crashes	Non-intersection Crashes	Intersection Crashes
1	Two Lane (Rural)	73	52	21
2	Four-Lane (Urban)	499	116	383

Intersection Analysis

Each intersection along the study corridor was analyzed to determine the number and type of crashes which occurred from 2000 through 2004. Table 7 summarizes this information. The number of crashes at the intersections increases generally from the lower volume unsignalized intersections in Segment 1 and in the western section of Segment 2 to the higher volume signalized intersections at the eastern section of the project.

Just as it was not possible to determine with certainty that all of the crashes listed are attributable to STH 21, the format of the crash data did not allow a definitive separation of the two STH 21 / USH 41 ramp intersections. Because of this, they are reported as a single intersection area; the 200 crashes at the USH 41 ramps are the total for both.

Table 7. Intersection Crashes by Type on STH 21 (2000-2004)

	Intersection	Crash Types						Crash Results			TOTAL
		Head On	Angle	Rear End	SSS	SSOP	No Collision	Fatal	Injury	Property Damage	
SEGMENT 1	Rivermoor Road	0	0	3	0	0	0	0	2	1	**3**
	Scott Street	0	1	0	0	0	1	0	1	1	**2**
	Reighmoor Road	0	4	1	0	2	0	0	3	4	**7**
	Marquart Ln. / Potratz Hill Rd.	0	1	0	0	0	0	0	0	1	**1**
	Sandpit Road	0	2	4	0	0	2	**1**	6	1	**8**
	Total	***0***	***8***	***8***	***0***	***2***	***3***	***1***	***12***	***8***	***21***
SEGMENT 2	Leonard Point Road	0	3	3	1	0	0	0	4	3	**7**
	Honey Creek Road	0	1	1	1	1	1	0	2	3	**5**
	Oakwood Road	0	5	9	2	0	1	0	9	8	**17**
	Emmers Ln / Westhaven Dr.	0	17	23	1	1	2	0	23	21	**44**
	Omro Rd / Westowne Ave.	1	18	21	3	0	5	0	18	30	**48**
	Washburn St.	1	15	19	1	2	1	0	19	20	**39**
	USH 41 Ramps	0	108	67	8	3	14	0	85	115	**200**
	Rath Lane	0	2	3	0	0	1	0	2	4	**6**
	Koeller St / Oshkosh Ave.	0	2	9	1	1	4	0	5	12	**17**
	Total	***2***	***171***	***155***	***18***	***8***	***29***	***0***	***167***	***216***	***383***

Segment Analysis

A brief synopsis of the crash analysis results for the two segments within the STH 21 study area is presented below.

Segment 1.

The two-lane portion of the STH 21 corridor has an overall crash rate of 75.26 crashes per hundred million vehicle miles, which is about 67% of the statewide average of 112 for rural state trunk highways. Similarly, the injury rate of 37.11 injury crashes per hundred million vehicle miles is also less than the statewide average of 45.0. The three fatal crashes that occurred in this Segment resulted in a fatality rate of 3.09 fatal crashes per hundred million vehicle miles. This is 1.8 times the statewide average rate of 1.7 for rural state trunk highways.

The three fatal crashes that occurred included two head-on crashes near the western end of the study area (west of Rivermoor Road) and one angle crash at the Sandpit Road intersection. Because of the high speeds in this part of the corridor – the legal speed limit is 55 mph – all crashes tend to be more severe, particularly crashes that involve vehicles traveling in different directions.

Segment 2.

A total of 499 crashes occurred in Segment 2, corresponding to a crash rate of approximately 622 crashes per hundred million vehicle miles, almost 2.2 times the statewide average crash rate of 283. Of these 499 crashes, 200 of them

occurred in the area of the USH 41 ramps. Although this data was reviewed in an attempt to eliminate those crashes that were not related to STH 21, some of these crashes could still be included in the data.

The injury rate of 264.25 injury crashes per hundred million vehicle miles for this segment is almost 2.7 times the statewide average of 98.2. There were no fatal crashes in this section, so the fatality rate is 0, compared to a statewide average of 0.6.

The frequent intersections that exist in this segment, both signalized and unsignalized, contribute to the higher than average crash rate. Field observations reveal that the existing intersections, particularly the USH 41 ramp intersections, are operating over capacity during many times of the day. Increased congestion adds to the number of crashes by extending queues that require unexpected stopping.

The high injury crash rate is attributable to the type of crashes that occurred, primarily angle and rear-end crashes. These types of crashes, often associated with signalized intersection operations, can be serious enough to cause injuries even at the relatively low speeds that exist in this segment.

Conclusion

The following paragraphs summarize the significant findings of the evaluation of the roadway safety for the STH 21 study corridor:

- The crash rate and the injury rate for Segment 1 are well below the statewide averages for rural state trunk highways, but the three fatal crashes that occurred in the 5-year study period make the fatality rate 1.8 times the statewide average.

- In Segment 1, approximately 30% of the crashes occurred at intersections (21 of 73).

- Segment 2 has a crash rate that is about 2.2 times the statewide average and an injury rate that is almost 2.7 times the statewide average. This poor safety record is caused by the large number of intersections in this relatively short section of roadway. The increased number of conflicts at intersections and the congestion that is common in this segment during parts of the day combine to increase the crashes in this segment.

- Segment 2 also had a higher than average proportion of crashes involving injuries. The fact that the injury rate exceeded the statewide average by a greater margin than the overall crash rate attests to this. This increased severity is attributed to the type of crashes (rear-end and angle crashes) that are taking place in this segment which has a relatively high density of intersections. There were no fatal crashes in this segment during the 5-year study period.

- In Segment 2, over 75% of all the crashes occurred at intersections (383 of 499).

- In Segment 2, almost half of all intersection crashes (200 out of 404) that occurred along STH 21 occurred at the USH 41 ramp terminal intersections. This number could be overstated due to the limitations of the summary data. Although the data used was reviewed in an attempt to eliminate those crashes not related to STH 21, some could still be included.

  There are a number of contributing factors to the high number of crashes at these intersections. First, these two intersections are the focus of the congestion that occurs on a daily basis. These conditions create long queues and stop and go traffic on the ramps and on STH 21, contributing to the number of rear end collisions (108 crashes of the 200 that occurred here). The other crash type that accounts for a large proportion of the crashes here is the angle collision (67 crashes of the 200). This crash type can rise when congestion rises, as drivers are likely to accept gaps that are too short to safely allow their maneuver. In addition to the crashes that occur at these intersections, queues extending upstream negatively impact the safety at the other intersections along this part of the corridor. There is currently an ongoing independent project to address the safety and capacity problems of this interchange.

In conclusion, the crash rate and the injury rate for Segment 1 indicate that this segment of STH 21 is safer than the average rural state trunk highways in Wisconsin, although the fatality rate is higher. Segment 2, with its higher than average crash rate and injury rate, is less safe than the average urban state trunk highway. The crashes that occur in Segment 2 are also more severe than average as indicated by the injury rate exceeding the statewide average by a greater margin than the overall crash rate.

Lake Butte Des Morts

Segment 1
Crash Rate = 75.26
Injury Rate = 37.11
Fatality Rate = 3.09

Segment 2
Crash Rate = 621.97
Injury Rate = 264.25
Fatality Rate = 0.00

Legend

Intersection Crashes

0 - 10	
11 - 25	
26 - 50	
50 +	

Highway 21 Crashes

X - Total Accidents
X/X/X - Property Damage Only/Injury/Fatality

0 0.25 0.5 1 1.5 Miles

WIS 21 - Rivermoor Road to US 41

Traffic Planning Analysis
Crash Analysis

Figure 1

WISCONSIN DEPARTMENT OF TRANSPORTATION

Appendix A

STH 21 Crash Analysis

	Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
		Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
Segment 1	**West Limit**	X		X						X				
		X		X						X				
		X			X							X		
		X			X						X			
		X							X			X		
		X							X			X		
	Subtotal	*6*	*0*	*2*	*2*	*0*	*0*	*0*	*2*	*2*	*1*	*3*	***6***	
	Rivermoor Rd.		X			X						X		
			X			X					X			
			X			X					X			
	Subtotal	*0*	*3*	*0*	*0*	*3*	*0*	*0*	*0*	*0*	*2*	*1*		***3***
		X							X			X		
		X							X		X			
		X					X					X		
		X							X		X			
		X						X				X		
		X					X					X		
		X						X			X			
	Subtotal	*7*	*0*	*0*	*0*	*0*	*2*	*2*	*3*	*0*	*3*	*4*	***7***	
	Scott St.		X						X			X		
			X		X						X			
	Subtotal	*0*	*2*	*0*	*1*	*0*	*0*	*0*	*1*	*0*	*1*	*1*		***2***
		X						X			X			
		X							X		X			
		X							X			X		
		X						X			X			
		X			X							X		
		X							X			X		
		X							X		X			
		X							X			X		
		X							X			X		
		X		X							X			
		X							X		X			
	Subtotal	*11*	*0*	*1*	*1*	*0*	*0*	*2*	*7*	*0*	*6*	*5*	***11***	
	Reighmoor Rd.		X		X							X		
			X		X						X			
			X		X							X		
			X		X							X		
			X					X			X			
			X			X					X			
			X					X				X		
	Subtotal	*0*	*7*	*0*	*4*	*1*	*0*	*2*	*0*	*0*	*3*	*4*		***7***
		X							X		X			
		X							X		X			
		X			X							X		
		X						X			X			
		X				X					X			
	Subtotal	*5*	*0*	*0*	*1*	*1*	*0*	*1*	*2*	*0*	*4*	*1*	***5***	
	Marquart Ln. / Potratz Hill Rd.		X			X						X		
	Subtotal	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*1*		***1***
		X					X					X		
		X							X			X		
	Subtotal	*2*	*0*	*0*	*0*	*0*	*1*	*0*	*1*	*0*	*0*	*2*	***2***	
	Sandpit Rd.		X			X					X			
			X						X		X			
			X			X						X		
			X						X		X			
			X		X						X			
			X			X				X				
			X			X					X			
			X		X						X			
	Subtotal	*0*	*8*	*0*	*2*	*4*	*0*	*0*	*2*	*1*	*6*	*1*		***8***

Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
	Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
	X							X		X			
	X							X		X			
	X			X						X			
	X						X				X		
	X		X							X			
	X							X			X		
	X					X				X			
	X					X				X			
	X						X			X			
	X							X		X			
	X		X							X			
	X			X							X		
	X							X			X		
	X							X			X		
	X				X					X			
	X							X			X		
	X							X		X			
	X			X							X		
	X			X							X		
	X					X					X		
	X			X							X		
Subtotal	*21*	*0*	*2*	*5*	*1*	*3*	*2*	*8*	*0*	*10*	*11*	***21***	
SEGMENT 1 SUBTOTAL	***52***	***21***	***5***	***16***	***11***	***6***	***9***	***26***	***3***	***36***	***34***	***52***	***21***
Leonard Point Rd.		X		X						X			
		X		X							X		
		X			X						X		
		X				X					X		
		X		X						X			
		X			X					X			
		X			X					X			
Subtotal	*0*	*7*	*0*	*3*	*3*	*1*	*0*	*0*	*0*	*4*	*3*		***7***
	X							X		X			
	X							X			X		
	X							X		X			
Subtotal	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*0*	*2*	*1*	***3***	
Honey Creek Rd.		X						X			X		
		X				X					X		
		X					X			X			
		X		X							X		
		X			X					X			
Subtotal	*0*	*5*	*0*	*1*	*1*	*1*	*1*	*1*	*0*	*2*	*3*		***5***
Oakwood Rd.		X		X						X			
		X		X							X		
		X			X						X		
		X		X						X			
		X		X							X		
		X			X						X		
		X				X				X			
		X			X					X			
		X			X					X			
		X			X					X			
		X			X					X			
		X			X						X		
		X		X						X			
		X				X					X		
		X						X			X		
		X			X					X			
		X			X						X		
Subtotal	*0*	*17*	*0*	*5*	*9*	*2*	*0*	*1*	*0*	*9*	*8*		***17***
	X			X							X		
	X					X					X		
	X			X						X			
	X			X							X		
	X			X						X			
Subtotal	*5*	*0*	*0*	*4*	*0*	*1*	*0*	*0*	*0*	*2*	*3*	***5***	

Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
	Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
Emmers Ln. / Westhaven Dr.		X			X					X			
		X		X						X			
		X		X						X			
		X		X						X			
		X			X						X		
		X		X							X		
		X			X						X		
		X			X					X			
		X					X				X		
		X		X						X			
		X		X						X			
		X			X						X		
		X			X					X			
		X			X					X			
		X						X			X		
		X			X					X			
		X			X						X		
		X		X						X			
		X		X						X			
		X				X					X		
		X			X						X		
		X			X					X			
		X		X							X		
		X			X						X		
		X			X						X		
		X			X					X			
		X			X					X			
		X			X					X			
		X		X						X			
		X			X					X			
		X			X					X			
		X		X							X		
		X						X		X			
		X		X							X		
		X		X							X		
		X		X							X		
		X		X							X		
		X		X						X			
		X			X						X		
		X			X					X			
		X			X					X			
Subtotal	*0*	*44*	*0*	*17*	*23*	*1*	*1*	*2*	*0*	*23*	*21*		***44***
	X							X		X			
	X			X							X		
	X			X						X			
	X			X						X			
	X			X							X		
	X			X						X			
	X			X						X			
	X					X					X		
	X			X							X		
	X			X						X			
	X			X						X			
	X			X						X			
	X					X					X		
	X				X						X		
	X					X					X		
	X					X					X		
	X				X						X		
	X					X					X		
	X					X					X		
	X					X					X		
Subtotal	*20*	*0*	*0*	*10*	*2*	*7*	*0*	*1*	*0*	*8*	*12*	***20***	

Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
	Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
Omro Rd. / Westowne Ave.		X		X							X		
		X		X							X		
		X		X							X		
		X		X						X			
		X		X						X			
		X				X					X		
		X			X					X			
		X		X						X			
		X			X						X		
		X				X					X		
		X			X						X		
		X		X							X		
		X				X					X		
		X		X							X		
		X			X						X		
		X						X			X		
		X						X		X			
		X			X						X		
		X			X						X		
		X			X					X			
		X		X						X			
		X		X							X		
		X		X						X			
		X		X							X		
		X		X							X		
		X						X			X		
		X			X					X			
		X						X			X		
		X			X					X			
		X			X						X		
		X			X						X		
		X			X						x		
		X						X		X			
		X			X					X			
		X			X						X		
		X			X						X		
		X		X						X			
		X			X					X			
		X			X						X		
Subtotal	*0*	*48*	*1*	*18*	*21*	*3*	*0*	*5*	*0*	*18*	*30*		***48***
	X			X						X			
	X			X						X			
	X					X				X			
	X				X						X		
	X				X						X		
	X			X						X			
	X			X						x			
	X			X							X		
	X							X			X		
	X			X						X			
	X			X							X		
	X			X							X		
	X			X						X			
	X			X							X		
	X			X							X		
	X				X					X			
	X				X						X		
	X							X			X		
	X				X					X			
	X							X			X		
Subtotal	*19*	*0*	*0*	*10*	*5*	*1*	*0*	*3*	*0*	*9*	*10*	***19***	
Washburn St.		X		X						X			
		X		X							X		
		X		X						X			
		X		X						X			
		X					X				X		
		X			X						X		
		X					X				X		
		X			X						X		
		X		X							X		
		X		X						X			
		X				X					X		
		X			X					X			
		X		X							X		
		X		X							X		
		X			X					X			

	Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
		Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
			X			X						X		
			X			X					X			
			X		X						X			
			X			X						X		
			X			X						X		
			X						X			X		
			X			X						X		
			X			X						X		
			X			X					X			
			X		X						X			
			X			X						X		
			X		X							X		
			X			X					X			
			X			X					X			
			X		X						X			
			X			X					X			
			X			X						X		
			X			X						X		
			X			X					X			
			X		X							X		
			X	X							X			
			X		X						X			
			X			X						X		
	Subtotal	*0*	*39*	*1*	*15*	*19*	*1*	*2*	*1*	*0*	*19*	*20*		***39***
		X			X						X			
		X			X							X		
		X			X						X			
		X					X					X		
		X			X						X			
		X			X							X		
		X		X							X			
		X			X						X			
		X			X							X		
		X			X						X			
		X			X						X			
		X			X							X		
		X			X						X			
		X			X							X		
		X			X							X		
		X			X						X			
	Subtotal	*19*	*0*	*1*	*15*	*0*	*3*	*0*	*0*	*0*	*11*	*8*	***19***	
	Hwy 41		X		X							X		
			X			X					X			
			X						X		X			
			X			X						X		
			X			X						X		
			X		X							X		
			X			X					X			
			X			X						X		
			X					X			X			
			X			X						X		
			X			X						X		
			X			X					X			
			X					X			X			
			X		X						X			
			X			X					X			
			X			X						X		
			X			X						X		
			X		X							X		
			X			X					X			
			X			X						X		
			X			X					X			
			X		X							X		
			X			X					X			
			X		X						X			
			X						X			X		
			X		X							X		
			X		X							X		
			X		X						X			
			X			X					X			
			X			X						X		
			X			X						X		
			X			X						X		
			X			X					X			

Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
	Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
		X		X							X		
		X						X		X			
		X			X						X		
		X		X						X			
		X		X							X		
		X				X					X		
		X						X		X			
		X		X						X			
		X			X					X			
		X			X						X		
		X			X					X			
		X		X						X			
		X			X					X			
		X						X			X		
		X		X						X			
		X			X					X			
		X		X						X			
		X				X					X		
		X			X						X		
		X		X							X		
		X		X							X		
		X			X					X			
		X			X					X			
		X		X						X			
		X		X							X		
		X			X					X			
		X		X						X			
		X			X						X		
		X			X					X			
		X			X					X			
		X			X					X			
		X			X						X		
		X						X			X		
		X			X					X			
		X			X						X		
		X		X							X		
		X			X						X		
		X			X					X			
		X			X					X			
		X			X					X			
		X			X						X		
		X			X						X		
		X			X					X			
		X		X						X			
		X					X			X			
		X			X					X			
		X			X						X		
		X			X						X		
		X			X						X		
		X			X						X		
		X			X					X			
		X		X						X			
		X			X						X		
		X		X							X		
		X			X						X		
		X			X					X			
		X		X						X			
		X		X							X		
		X		X							X		
		X			X						X		
		X						X			X		
		X		X						X			
		X						X			X		
		X			X						X		
		X		X							X		
		X		X						X			
		X				X					X		

		Crash Location		Crash Type						Crash Severity			Total Crashes	
	Intersection	Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
			X		X						X			
			X		X						X			
			X		X						X			
			X				X					X		
			X		X							X		
			X						X			X		
			X		X							X		
			X		X						X			
			X		X						X			
			X		X							X		
			X		X						X			
			X		X						X			
			X		X						X			
			X		X							X		
			X		X						X			
			X		X							X		
			X		X							X		
			X		X						X			
			X						X			X		
			X		X						X			
			X				X					X		
			X		X							X		
			X		X						X			
			X		X							X		
			X		X							X		
			X		X							X		
			X						X			X		
			X		X							X		
			X		X							X		
			X		X							X		
			X						X			X		
			X		X							X		
			X		X							X		
			X			X					X			
			X		X						X			
			X		X							X		
			X				X					X		
			X		X						X			
			X		X							X		
			X		X							X		
			X		X							X		
			X		X							X		
			X		X						X			
			X		X							X		
			X		X							X		
			X		X							X		
			X		X							X		
			X		X						X			
			X						X			X		
			X		X							X		
			X		X							X		
			X		X							X		
			X		X						X			
			X		X						X			
			X		X							X		
			X		X							X		
			X		X							X		
			X		X							X		
			X		X						X			
			X		X						X			
			X				X					X		
			X				X					X		
			X		X						X			
			X		X							X		
			X		X							X		
			X		X							X		
			X		X						X			
			X		X							X		
			X		X						X			
			X		X						X			

Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
	Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
		X		X						X			
		X		X						X			
		X		X						X			
		X		X						X			
		X			X						X		
		X		X						X			
		X		X							X		
		X		X							X		
		X		X							X		
		X		X						X			
		X		X							X		
		X		X							X		
		X						X			X		
		X		X							X		
		X		X						X			
		X		X							X		
		X		X							X		
Subtotal	*0*	*200*	*0*	*108*	*67*	*8*	*3*	*14*	*0*	*85*	*115*		***200***
	X							X		X			
	X							X			X		
	X			X							X		
	X					X					X		
	X							X			X		
	X							X			X		
	X			X						X			
	X							X			X		
	X			X							X		
	X			X							X		
	X							X			X		
	X					X				X			
	X			X							X		
	X					X					X		
	X			X							X		
	X							X			X		
	X							X		X			
	X					X					X		
	X			X							X		
	X			X							X		
	X			X							X		
	X			X							X		
	X					X					X		
	X			X						X			
	X			X							X		
	X			X							X		
	X			X							X		
	X				X						X		
Subtotal	*27*	*0*	*0*	*13*	*1*	*5*	*0*	*8*	*0*	*5*	*22*	***27***	
Rath Ln.		X		X							X		
		X			X						X		
		X						X			X		
		X		X						X			
		X			X					X			
		X			X						X		
Subtotal	*0*	*6*	*0*	*2*	*3*	*0*	*0*	*1*	*0*	*2*	*4*		***6***
	X			X						X			
	X			X						X			
	X				X					X			
	X							X			X		
	X				X						X		
	X				X						X		
	X			X							X		
	X			X							X		
	X							X			X		
	X			X						X			
	X			X							X		
	X			X							X		
	X							X			X		
Subtotal	*13*	*0*	*0*	*7*	*3*	*0*	*0*	*3*	*0*	*4*	*9*	***13***	

Intersection	Crash Location		Crash Type						Crash Severity			Total Crashes	
	Corridor	Intersection	Head On	Rear End	Angle	SSS	SSOP	No Collison	Fatal	Injury	Property	Corr	Int
Koeller St. / Oshkosh Ave.		X		X							X		
		X						X		X			
		X					X			X			
		X						X			X		
		X			X						X		
		X			X						X		
		X			X						X		
		X			X					X			
		X						X			X		
		X				X					X		
		X			X						X		
		X			X					X			
		X		X							X		
		X			X					X			
		X			X						X		
		X						X			X		
Subtotal	*0*	*17*	*0*	*2*	*9*	*1*	*1*	*4*	*0*	*5*	*12*		***17***
	X			X						X			
	X			X							X		
	X							X			X		
	X			X							X		
	X							X		X			
	X							X		X			
	X							X		X			
	X							X			X		
	X							X			X		
	X		X								X		
Subtotal	*10*	*0*	*1*	*3*	*0*	*0*	*0*	*6*	*0*	*4*	*6*	***10***	
SEGMENT 2 SUBTOTAL	*116*	*383*	*4*	*233*	*166*	*35*	*8*	*53*	*0*	*212*	*287*	***116***	***383***
Totals	**168**	**404**	**9**	**249**	**177**	**41**	**17**	**79**	**3**	**248**	**321**	**168**	**404**
												Total Crashes =	**572**